Retention Tank Design and Construction Checklist

Tank ID: _____

Note: Items identified with an asterisk (*) are required by state or federal regulations for hazardous and mixed waste wastewater retention tank systems.

A. Administrative

1. _____ The proposed project has approved NEPA documentation.

2. _____ The tank system has been assigned an identification number by the Operations and Regulatory Affairs Division's (ORAD) Tank Assessments and Guidance Group (TAGG).

3. _____ ORAD, including TAGG, has reviewed and approved the design.

4. _____ The Environmental, Safety, and Health (ES&H) Team Leader reviewed and approved the design.

5.* _____ Provisions for obtaining any required permits have been made. Permits are required for:
Hazardous and mixed waste storage tanks >5000-gallon capacity.
Hazardous and mixed waste storage tanks if stored >90 days.
Underground storage tanks (UST) if regulated by the California UST regulations.

6.* _____ If the tank is a hazardous or mixed waste storage tank, an engineering assessment has been completed and stamped by an independent, California-registered, professional engineer before placing the tank in service.

7. _____ All documentation has been provided (e.g., drawings, specifications, installation inspection, leak test and corrosion certifications, etc.).

Notes: Existing tank systems are those that were installed prior to July 14, 1986, and are required to have an engineering assessment performed in accordance with 40 CFR 265.191[17] and 22 CCR 66265.191[26] if no secondary containment is provided.

New tank systems are those that were installed after July 14, 1986, and for which the requirements of 40 CFR 265.192[4] and 22 CCR 66265.192 [5] et seq. apply (e.g., secondary containment, engineering assessment, installation certifications, etc.).

For USTs, California law requires that tanks installed after January 1, 1984 (after December 22, 1988, for federal law), must have secondary containment, corrosion protection, overfill protection, etc.

B. Primary/secondary containment

1.* _____ The ability to leak test both primary and secondary containment for piping and tanks is provided. (Flanges or test valves for piping secondary containment are provided. **Note:** It is recommended that a 4-inch minimum opening access and an overhead clearance [approximately 3 feet] be provided for precision test equipment.)

2.* ____ Both primary and secondary levels of containment have been provided for all tanks and underground piping and ancillary equipment, unless exempt.

3.* ____ The volume of secondary containment is adequate. See 40 CFR 265.193(d)[9] and 22 CCR 66265.193(d).[10] ("Adequate" means that secondary containment can hold 100% of tank volume for single tank, 100% of largest tank if multiple tanks are contained within the same secondary containment structure, 150% of largest tank if a UST, or 10% of total volume if greater, plus the volume from a 25-year, 24-hour storm [approximately 4 inches] if exposed to rainfall.)

4.* ____ Tanks storing incompatible liquids are not located in the same secondary containment area.

5. _____ Tank systems are properly vented and evaluated for air permitting or abatement if the expected waste stream will contain volatile organic compounds or could emit ignitable or explosive vapors.

6.* ____ The secondary containment will prevent both vertical and lateral migration of wastes into the environment.

7.* ____ Secondary containment is designed such that it prevents infiltration of groundwater or run-off from entering the secondary containment. Vaults are tar-coated on exterior and sealed on the inside, if necessary to prevent groundwater or rainwater infiltration.

8. _____ Water stops have been placed at all joints in the secondary containment structure, if any. (Applies to concrete vaults or tanks.)

9.* ____ The secondary containment is sloped to a collection point, and a means to remove any accumulated liquid is provided, e.g., submersible pump, drain pipe, access for vacuum hose, etc.

10. _____ The primary and secondary containments are leak-tight and completely impervious to the contained substance for the intended life of the structure.

11. _____ All outlets (berm drains, sanitary sewer connections, and hose connections) have locking valves, locking caps, or the equivalent.

C. Leak detection

1.* _____ The system has some method of leak detection. **Note:** Automatic leak detection monitoring with alarm notification surveyed at least once every 24 hours is preferred; otherwise, use visual inspection every 24 hours that a tank system is in use.

2.* _____ For secondarily contained systems, a flow path is provided for leaks to be detected by automatic or visual detection (e.g., sloped to a sump, no obstructions to prevent flow, etc.).

D. Documentation

1.* ____ Drawings showing the actual location and orientation of the system, and the associated ancillary equipment are provided in the form of as-built drawings.

2. _____ A piping and instrumentation diagram (P&ID) is provided, showing the direction of flow; identifying all valves, pumps, indicators, and controls with a number; and showing all connections and flanges.

3. _____ A diagram is provided, showing the control panel layout and an elementary wiring schematic.

4. _____ An Operational Plan is provided for the system, including a system description, operator training requirements, operating procedures, system schematic, sampling instructions, inspection and monitoring instructions, emergency response procedures, and other information (as required).

5.* ____ A Monitoring Program that describes the monitoring requirements and procedures and leak response actions is provided. (This requirement applies only to California-regulated USTs, and it must be approved by Alameda County for Livermore Site or San Joaquin County for Site 300.)

6. _____ Two sets of the completed drawings and diagrams and one set of the construction specifications have been submitted to TAGG for that group's permanent files.

7. _____ A maintenance plan, including a list of components with their respective maintenance actions and schedule, has been provided to the tank system operator and TAGG.

8. _____ A complete list of the components being used has been compiled, indicating the manufacture's name, component name, and part number. (Verification of material compatibility is required; refer to checklist item G.1.)

9. _____ Vendor literature for tanks, level sensors, pumps, etc., including design standards, specification sheets, operating, maintenance and installation instructions, and other general information, has been retained for future reference. (Probably retained by Plant Engineering.)

10. _____ Copies of Material Safety Data Sheets for all materials of construction in contact with the waste are obtained from the respective manufacturers.

E. Construction certifications

1.* _____ Installation Inspection: Installation of the tanks has been inspected by a qualified, independent tank installation inspector or a similarly qualified, professional engineer; and a signed certification statement has been provided.

2.* _____ Corrosion Protection: Components that are subject to corrosion are designed (for California-regulated USTs), inspected, and any field installation or fabrication of corrosion-resistant materials is supervised by an independent, certified corrosion expert, and the signed certification of proper installation of the corrosion protection system is provided.

3.* _____ Leak Test: All components of the tank system (e.g., tanks, piping, secondary containment, etc.) have been tested for leak-tightness prior to placing the system in service, and a certification is provided stating that the system is leak-tight.

4.* _____ Proper UST Installation**:** Certification by the owner or owner's agent that the UST was installed properly by qualified personnel and that the system was inspected before being placed into use. (This requirement applies only to California-regulated USTs, and certification must be provided to the local regulatory agency on Form C from the State Water Resources Control Board.)

5. _____ All of the signed certification statements listed above have been retained in a permanent file, and copies of the certification statements have been submitted to TAGG for the group's permanent files.

F. Seismic analysis

1.* _____ Plant Engineering, or a contractor, has completed a seismic analysis in accordance with *Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*.[6] Ensure that appropriate factors have been used, e.g., category (General Use, Low Hazard, etc.), accelerations, seismic zone (Zone 4 for LLNL).

G. Material compatibility

1.* _____ The compatibility of all materials (tanks, coatings, liners, piping, pumps, valves, gaskets, O-rings, etc.) in contact with the substance(s) to be contained has been verified, or in-house tests have been performed to verify compatibility.

2. _____ Test documentation has been retained in permanent files.

H. Overfill and spill prevention

1.* _____ Spill prevention and removal capabilities are provided.

2.* _____ The system is provided with overfill protection (e.g., check valves, automatic shut-off, automatic by-pass, level indication, high-level alarms, etc.).

I. Corrosion protection

1.* _____ Potential corrosion (see 40 CFR 265.192 [a][3][4] and 22 CCR 66265.192[a][3][5]). (If metal in contact with soil or water, a corrosion analysis by a corrosion expert must be performed in accordance the regulations.)

2. _____ Corrosion-resistant materials have been used and/or corrosion-resistant materials installed.

3. _____ All metal surfaces are painted or coated.

4. _____ Any plastic (e.g., PVC, fiberglass, etc.) piping or components are painted or coated for ultraviolet protection.

5.* _____ Field installation of corrosion protection system was supervised by and certification provided by a corrosion expert.

J. General design considerations

The design at a minimum has considered the following items:

1.* _____ Settlement, compression, uplift. (Pad area is sufficient for load, "dead-man," or other device used for underground tanks, etc.)

2.* _____ Wind loading. (Appropriate tank holddown straps, bolts, cables, etc., were used.)

3.* _____ Venting. (Check size of vents versus expected flow rates from pumps or drains, height of vents to avoid spillage from overfilling, float-check valves if necessary, explosion relief vents for petroleum tanks, etc.)

4.* _____ Sufficient anchoring and supports provided for piping, pumps, and tanks. (Tanks in vaults or berms must be properly anchored to resist seismic or buoyant forces.)

5.* _____ Soil conditions (e.g., settling and erosion potential).

6.* _____ Freeze protection has been provided in the form of insulation, heat tape, or other means for piping, tanks, and other equipment that may be susceptible to freezing.

7. _____ Adequate access provided for ease of maintenance, sampling, operation, and inspections.

8. _____ Vehicular traffic. (Access is provided for emergency vehicles; barricades are in place to protect equipment from vehicles, etc.)

9.* _____ All components of the tank system meet or exceed the applicable design and safety standards (U.S. Department of Energy, Uniform Building Code, American Society for Testing and Materials, Underwriters Laboratory, etc.). Design standards used must be clearly referenced on the drawings or in the construction specifications.

10.* _____ The backfill material is noncorrosive, porous, and homogeneous, and it has been carefully installed and uniformly compacted such that it supports the tank(s) and piping uniformly.

11.* _____ The proper depth of cover for all underground components has been provided to prevent damage from surface vehicular traffic.

12. _____ Dual storage tanks are provided to allow for sampling and analysis prior to disposal. Tank sizes are such that they ensure adequate capacity for expected flow rates and for four weeks of analysis turnaround time.

13. _____ System has mixing capability. **Note:** Mechanical mixing or air sparging are recommended. If pump recirculation is used, adequate mixing intensity must be provided (0.5 to 2.0 horsepower, or greater, depending on the tank geometry). An EPD Air Quality Specialist must evaluate sparging operations for possible permitting requirements.

14. _____ Flexible couplings or joints are provided where necessary. Long, straight runs of pipe terminating at a tank or other fixed object have been avoided.

15. _____ Tank system has had an operational test to verify that system controls and alarms operate as designed.

K. Labeling

1. _____ A permanent identification tag displaying the ID number of the tank assigned by TAGG is clearly visible and is affixed to the tank(s).

2.* _____ A permanent label describing the contents (e.g., hazardous waste, laboratory waste, toxic, radioactive, flammable, etc.) of the tank system is affixed to the tank(s).

3.* _____ If the tank(s) stores hazardous or mixed waste, a label is attached to each tank with a date entered for when the storage of the hazardous or mixed waste began.